

**REMARKS**

Applicants respectfully request reconsideration of the present application.

**I. Disposition of the claims**

Claims 16-53 are pending. Claims 16-35 & 38-40 are rejected. Claims 36-37 & 41-52 are withdrawn and are maintained as Applicants' reminder to file a divisional application at an appropriate time. Claim 53 is new and supported by the specification as filed, e.g., paragraph 105.

**II. Written Description rejections under 35 U.S.C. § 112, first paragraph**

There are two written description rejections. Each is addressed under a separate header.

**A. New matter type--"compositional uniform"**

Claims 16-35 and 38-40 are rejected as failing to supported by a written description for the claim limitation "compositional uniform" nanomaterial. Office action, para. 3. According to the rejection, "[t]he terminology is not found in the originally filed specification explicitly or implicitly. Therefore, the new limitation "compositional uniform" is considered new matter and' should be canceled." Office action, para. 3.

This rejection is traversed for two sets of reasons applicable to different sets of claims.

***1. Claims 16-25***

The Examiner is referred to paragraph 105 of the as filed specification. Discussing and incorporating by reference US Pat No. 5,984,997, a relevant part of the specification reads as follows: "Usually, combustion temperatures will be in excess of 600 °C, a temperature at which diffusion kinetics will be sufficiently fast that a **compositionally uniform** powder will be produced." {para. 105} (emphasis added). Along these lines, the Examiner is referred to paragraph 176 of the as filed specification, a relevant part concerning tungsten-doped tin oxide reads "Crystallite sizes as measured by X-ray diffraction range from 20 to 30 nm for the primary peaks of the SnO<sub>2</sub> powder, and there are no apparent secondary phases attributable to tungsten." Because there are no secondary phases attributed to the

dopant, there is support for compositionally uniform, both literally and exemplary. Thus, this rejection should be withdrawn.

**2. Claims 26-35 & 38-40**

These claims do not recite the term "compositional uniform" and thus the rejection should be withdrawn as to these claims.

**B. Combining a dopant into the lattice of a metal compound**

It is respectfully submitted that the Examiner's reasoning is hard to follow. The logical basis for the rejection is that "The specification as originally filed does not provide a process step of combining a dopant into the lattice of a metal compound." Office action, para. 4.1. Yet example 9 clearly exemplifies such a process and is described to produce a SnO<sub>2</sub> product in which "no apparent secondary phases attributable to tungsten" were identified. Similarly, example 10 of the present specification describes producing "phase-pure spinel ferrite" of copper-doped nickel zinc ferrite. From these descriptions, a practitioner of ordinary skill in the art will understand that doped, essentially compositionally uniform, nanocrystalline materials have been produced in examples 9 and 10. Thus, to the extent that the rejection is based on a lack of process, that basis is contradicted by the present specification.

The rejection's logic also emphasizes that "the lattice is non-existing," Office action, para. 4.1, and "no lattice is present" in the emulsion precursor. Office action, para. 4.2. The Examiner may be considering processes in which a dopant element is introduced into an existing metal compound lattice, such as in Schmidt and Lawandy. The present specification describes the processes of both the '997 patent (U.S. patent no. 5,984,997) and the '507 patent to be "particularly preferred" (Specification, paragraph 96). The '997 patent teaches processing a liquid precursor via combustion to produce nanoscale powders. The '507 patent (U.S. patent no. 5,851,507) teaches processing solid particles via high temperature processing to produce nanoscale powders. Without intending to be limiting, some have theorized that the high processing temperatures from either the '997 or '507 process destroy any existing metal compound lattice in the precursor material. This is regardless of whether the precursor is solid or liquid. The precursor is essentially reduced to its constituent elements. When the

reaction stream is quenched, the precursor elements condense to form the nanoscale material with a new lattice. That is, in this theory, the lattice forming and doping steps occur essentially simultaneously in the process. Applicant respectfully submits that a separate process step for the doping is optional. Applicant further submits that the processes of the '997 and '507 patents, described as "particularly preferred" in the present specification, are fully enabling, and that the examples in the present specification and the '997 and '507 patents exemplify the process and the products.

In view of the reasons just mentioned, the rejection is respectfully requested to be withdrawn.

### III. **35 U.S.C. § 112, first paragraph-Enablement Rejection**

There are two enablement rejections. Each is addressed under a separate header.

#### A. ***Powders***

Claims 16-35 and 38-40 are rejected as non-enabled by the present specification, because, in relevant part, the '997 patent (U.S. patent no. 5,984,997) discloses a method of making nanoscale powder from a powder, not from a mixture as recited in the present claims. Applicants respectfully submit that including the '997 patent in this regard was in error; the '997 patent discloses liquid phase precursors. The Examiner is asked to review the '997 patent, including its cross-references to the '507 patent and the '738 patent. Because the premise of the rejection is wrong, it is respectfully submitted that the present rejection is improper and should be withdrawn.

#### B. ***Combusting***

Claims 16-35 and 38-40 are rejected as non-enabled, because the specification, while being enabling for a combustion process of an emulsion to obtain nanoscale particles, does not reasonably provide enablement for any method other than combustion. Office action, para. 6. The Examiner's attention is drawn to the '507 patent, which the present specification describes as a "particularly preferred" method. This patent discloses multiple heat sources as useful for high temperature processing of the precursor. The present rejection should be withdrawn.

#### IV. Rejections under 35 U.S.C. § 102

Claims 16-35 and 38-40 were rejected as anticipated under § 102(b) using two different references, namely, Schmidt (U.S. Pat. No. 5,590,387) and Lawandy (U.S. Pat. No. 5,882,779). Each rejection is addressed under a separate header. Furthermore, another header is made to address a previously withdrawn rejection, which again became relevant by the present version of the claims. See Hampden-Smith (U.S. Pat. No. 6,180,029, Office action dated July 12, 2006).

At its basic level, this rejection, coupled to the § 112, para. 1 rejection, amounts to an improper squeeze. The assertions for this rejection and the enablement rejection cannot both be true and supported by substantial evidence at the same time. Thus, the rejection should be withdrawn.

##### A. *Schmidt*

The positions stated of record are maintained and incorporated here. In addition, the Examiner stated that “Therefore, ‘substantially compositionally uniform’ can be interpreted as having no or little impurity that does not affect the main composition of the particles.” Office action, para. 7.2. It is respectfully submitted that this interpretation cannot be reconciled with the claim language reading as follows: *wherein combining the at least one dopant element into the lattice of the metal compound modifies at least one property of the metal compound*. Thus, the subject matter of Schmidt differs from that as claimed, and the rejection should be withdrawn.

##### B. *Lawandy*

The positions stated of record are maintained and incorporated here. The Examiner maintains that “the specification provides no description as to the combination step; therefore, this step can be interpreted broadly as combination of the dopant into a material.” Office action, para. 7.3. For the reasons stated above, it is respectfully submitted that the present version of the claims avoids this issue and that the specification provides a description of combusting and of compositionally uniform. Since Lawandy’s coated products cannot be viewed as “substantially compositionally uniform,” this rejection should be withdrawn.

##### C. *Hampden-Smith*

In a previous Office action dated July 12, 2006, the Examiner cited U.S. Patent no. 6,180,029 against some of the claims of the instant application. Applicant successfully traversed that rejection by removing oxygen from the allowable elements in Claims 16 & 26. Amendment Dated Mar. 12, 2007.

Upon reconsideration, Applicant believes that Hampden-Smith is not relevant to the patentability of the present claims. The '029 patent teaches micron size or sub-micron materials, with domain sizes between "0.3 micron and 5 micron" (that is, 300 to 5000 nanometers). The instant application teaches nanoscale materials with domain sizes of 100 nanometers or less. Since Hampden-Smith's products cannot be viewed as "nanoscale", Hampden-Smith should not be used as the basis to reject claims in the instant application.

#### **V. Conclusion**

It is believed that the present application is in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.


The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check or credit card payment form being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicant hereby petitions for such extension under 37 C.F.R. § 1.136 and authorizes payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

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